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BREAD GRAIN CONSUMPTION AND TRADE

in

SCANDINAVIAN COUNTRIES

by

J. H. Shollenberger
Grain Specialist in Europe

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C O N T E N T S

Note: All conversions to United States money in this report have been made on the basis of the weekly average exchange rate for the last week of December, 1933.

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Sweden

Production and requirements

Prior to the war, rye production in Sweden was approximately three times greater than wheat production but since the war wheat production has doubled, rye production has fallen off and at the present time wheat production is much greater than rye production. The wehat crop this year is estimated at 27,815,000 bushels, a record outturn, and rye production 18,267,000 bushels. Wheat yields have been unusually good the past two years averaging around 35 bushels per acre, and this partly accounts for the recent marked upward trend in wheat production.

The trend toward increased production and utilization of wheat and decreased production and utilization of rye is believed largely due to a response to the relative prices of each and to consumer preference. Wheat generally yields more bushels to the acre than rye and brings a little higher price than the latter and hence is more profitable to the producer. Furthermore, it is said that losses from damage due to wet conditions at harvest time are less likely to occur with wheat than with rye. This is attributed to the fact that wheat generally is of harder kernel texture and consequently is more impervious to moisture.

Domestic wheat and rye production in Sweden is not large enough to satisfy the bread grain requirements and imports of wheat and rye during the years from 1925 to 1931 have varied from 5,000,000 bushels to 12,000,000 bushels. Wheat imports during this period have held quite constantly at six to seven million bushels. In the 1932 crop-year, however, an excellent domestic crop reduced imports of wheat substantially below this figure. The consumption of wheat has followed to some extent the trend in domestic wheat production. An average disappearance or consumption of wheat of approximately 26,000,000 bushels during the past five years compares with 15,000,000 bushels prior to the war. The additional consumption of wheat flour is partly explained by changes which have occurred in the percentages of wheat flour mixed with rye flour in making so-called rye bread. At the present time, to-called rye bread contains as much as 65 percent wheat flour. See tables, page 33.

Characteristics and quality of Swedish wheats.

The wheats of Sweden are of the so-called common type or species. They are red in color and mostly of winter habit. In 1913, 95.6 percent of the total production was of winter wheat and 4.4 percent of spring wheat. Since then the percentage of spring wheat has steadily increased until in the 1933 crop, it constituted 18.5 percent of the total, The spring wheats are of harder texture and usually of better quality and higher protein content than the winter wheats. The protein content (13.5 percent moisture basis) of the winter wheats prior to 1930 averaged about 6.0 percent, whereas that of spring wheat was around 10.4 percent. Since 1930 the protein content of the winter wheat has averaged about 9.4 percent. This improvement has been

due chiefly to the substitution of winter varieties of better quality, for the English square head varieties which had been grown in years past, Improvement in the spring wheats grown has not been so marked. It is reported that from 70 to 80 percent of the spring wheat produced is of a variety called Diemant.

The spring wheats are semi-hard to hard in texture, but most of the winter wheats are of the soft type. Some hard winter varieties have been grown but these have not proven successful. The work of improving the quality of the wheats is in the hands of private enterprise supported in part by government appropriations. Usually the best quality wheats are produced in the middle sections of Sweden, but it is reported that in 1932 the best wheats were produced in the southern part of the country. Some of these are reported as containing as much as 11.2 percent of protein (13.5 percent moisture basis). Since mostly winter wheats are produced in this section this occurrence was all the more remarkable.

The moisture content of Swedish wheat and rye is usually high ranging from about 15 percent to 22 percent. In the best years it averages about 16.5 percent and in the worst years in the neighborhood of 19 percent. These high moisture contents are caused by the wet weather which generally prevails at harvest time which in turn results in a considerable percentage of sprouted kernels. It has been reported that, because of the presence of germinated kernels and the spoilage due to excessive moisture, about 20 percent of the crop is ordinarily unsuitable for milling purposes. In the 1932 and 1933 crops, however, there was practically no damage of a nature that would make the grain unsuitable for milling purposes.

The grain produced is usually fairly clean and of low foreign matter content. Some foreign matter occurs but not to any such extent as in the case of some United States wheats. Garlic occurs only in the wheats produced on Gotland Island. The 1932 and 1933 crops of wheat and rye were not only unusually large but also superior to the usual run of crops in quality, soundness and natural weight. Several millers and cereal chemists reported that these were the best crops within their experience. In general, however, the quality of Swedish wheats is poor. They are low in gluten content and the gluten is of poor quality which is said to be due to an excess of gliadin. They are high in diastatic activity and therefore of high gassing power. In many cases, especially in normal crop years the diastatic activity is too high for satisfactory baking results. The addition of foreign wheats is necessary in the milling mixtures not only for the purpose of adding to the gluten content and quality of the resultant flour but for lowering diastatic activity as well.

The flours milled from Swedish wheats are of lower water absorbing capacity and when baked into bread yield loaves of low volume. In the following table are presented data by Dr. Hagaberg, one of the outstanding milling engineer-chemists of Sweden, showing the water absorption percentages and the loaf volumes obtained with wheat flours milled from Swedish, Manitoba and

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Barusso wheats of various grade types. It will be noted from these data that there is quite a range in water absorption for the various classes of wheats and also in the loaf volume made from their respective flours. Among the

Water absorption, bread and volume yield of different types of wheat (Flours with a 60 percent extraction milled on an experimental mill)

Wheat type and quality grade	Flour consumption per liter of water a/	Water absorption of flour a/	Loaf volume per 100 grams of flour
	Grams	Percent	C.C.
Manitoba, good	1,600	62.5	1,000
" normal	1,700	59.0	800
" poor	1,850	54.0	700
Barusso, good	1,750	57.0	900
" Normal	1,850	54.0	750
" poor	1,950	51.2	600
Swedish spring wheat, good	1,750	57.0	800
" " " normal	1,900	52.5	600
" " " poor	2,100	47.5	500
Swedish winter wheat, good	1,900	52.5	650
" " " normal	2,000	50.0	500
" " " poor	2,400	41.6	450

Zeitschrift fuer das Gasamte Getreidesesen, No. 7, July 1930. a/ Based on 15 percent moisture content of flour.

Swedish samples tested the spring wheats showed a marked superiority over the winter wheats but both classes generally showed an inferiority to the other wheats, especially in loaf volume.

In physical appearance the Swedish spring wheats resembel the Preston or Bluestem spring wheat varieties as grown in the United States. They range in color or vitreous appearance from starchy to dark but are more often starchy or mottled than dark. In kernel texture they are somewhat softer than United States spring wheats and in baking strength are about on a par with United States wheats of the Red Spring sub-class and the poorer types of the Northern Spring sub-class. The winter wheats resemble the Red Winters of the Eastern States and are probably of similar quality. The spring wheats in Sweden arethe most desirable for bread flours and usually command a premium over the winter wheats. These spring wheats in many instances are marketed on a protein content basis. The winter wheats are well suited for pastry and cake flours of the type made in the United States but are considered too weak for the particular type of pastry products made in Sweden and other Scandinavian countries.

Under present price and milling regulations practically all wheat and rye of millable quality is utilized for flour making and only the unsound or damaged wheat and rye is used for feeding purposes.

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Milling regulations

In 1930 through the enactment of certain legislative measures the government of Sweden definitely committed itself to a policy of aiding the agricultural industry. An order was published on June 13, the object of which was to assist the farmers in the marketings of their wheat and rye by requiring that all millers milling foreign rye or wheat (except for macaroni purposes) must use a certain percentage of domestic grain and that all imported flours (except those of macaroni purposes) must add a certain percentage of pure Swedish flour. These percentages have been fixed in accordance with the size and use of the crop and usually apply to periods for a month or two at a time.

In addition to the milling percentages at the present time there is an association of Swedish flour millers called the "Svenska Spanmals-foreiningen" which has a state import monopoly and the right to impose a levy on imports as a means of covering its costs of operation and any losses it might suffer. It was formed in 1931 and was granted its powers for undertaking the responsibility of purchasing all surplus grain remaining in the country during the period June 1 to July 31, 1931 on a basis of a minimum price fixed by the government. This scheme which has been in operation continuously since its inception includes the provision that during the period mentioned mills can purchase their supplies of wheat only through this Association. It is of interest to note that the minimum price effective for June 1, is increased by 1 öre (.07 of a cent a bushel at current exchange) each day thereafter during the two month period designated in which the Association must purchase the remaining stocks of domestic wheat and rye.

No minimum prices were fixed at which millers are required to make their purchases either during the period August 31 to May 31, when they are permitted to buy direct from the producer or during the period when their purchases must be made from the Swedish Millers' Association; neither is the miller required to buy by grade. The compulsory use of Swedish grain and the fixed minimum price which the farmer knows he can get for his grain on and after June 1, forces the miller, however, to pay prices somewhat in line with the June 1, minimum price. Another factor which helps in this direction is the enactment of certain regulations providing facilities for the storage and financing of grain so that the farmer is able to retain ownership of his crop until June 1. The scheme has been continued ever since its adoption and apparently has been operating very successfully.

Some changes have been made in the percentages of domestic grains required to be used, as well as in the June 1 minimum prices for the various crop years. These changes did not in anyway conflict with the original scheme since it was anticipated from the beginning that such changes would be adivsable from time to time. At the time, June 1933, when the information for this report was collected millers belonging to the Swedish Milling Association were required to use 88 percent of domestic wheat and 98 percent

of rye in their milling mixtures whereas the requirements for millers not belonging to this Association were 98 percent and 100 percent respectively. Included as members of this organization are all of the large and medium sized mills and most of the modern type small mills. In return for the greater leniency in the matter of percentages of foreign grain shown to Association members these members are obliged to store certain specified quantities of grain for farmers at charges fixed by the government.

Milling practices

In Sweden there are approximately 80 mills of the modern type and approximately 4,000 old time mills of the wind mill type. The grinding capacity of the former range from 100 to 2,000 bbls. of flour per 24 hours. The mills of the wind mill type are of low grinding capacity and operate on a grist grinding basis. Their business is chiefly that of grinding feed for farmers. They make some flour but this is of the whole meal sort and usually from rye. Practically all of the commercial milling is done by the mills of modern type. Some of these operate solely on wheat and some solely on rye. In the case of wheat milling their production constitutes about 95 percent of the total flour production of the country. and in the case of rye milling about 80 percent. According to data contained in an official Swedish bulletin the quantities of various sorts of flour and meals produced in 1931 by Swedish mills are as follows:

Item	100 pounds.	Item	100 lbs.
Wheat flour.....	6,212,717	Oat meal.....	78,043
Rye, flour.....	2,923,917	Rice meal.....	8,818
Barley flour.....	36,111	Maize 283,247	
		Other meals.....	5,445

Two mills are operated by a cooperative association. These are the two largest mills in Sweden. One is located at Göteborg and the other at Stockholm. The largest incorporated milling company of the country operates 7 large mills and is said to mill about one-fourth of the total production of flour. All of the large mills are located at seaport towns and have modern facilities for receiving grain from ocean going vessels.

The grain storage facilities at the large mills are of the modern bulk type. In some instances this storage space in relation to grinding capacity is comparable to that of the United States mills, but in most instances it is relatively lower. Figures are presented belowwhich show the storage space in comparison with grinding capacities for three of the better mills of Sweden. These figures are believed to be representative only of the better class of mills and no doubt are considerably higher than the general average.

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	Grinding capacity per 24 hours	Grain storage capacity
Mill No. 1.	2,000 bbls. wheat flour 550 bbls. rye flour	350,000 bushels
Mill No. 2.	1,100 bbls. wheat flour 400 bbls. rye flour	290,000 bushels at mill 85,000 bushels at port-silos Also has some country elevators
Mill No. 3.	1,450 bbls. wheat flour 400 bbls. rye flour	60,600 bushels wheat 20,200 bushels rye

The equipment of the larger mills is as up-to-date and complete as that found anywhere else in the world. All have wheat washers and conditioners and are fully equipped to remove foreign matter of any and all sorts from the wheat or rye that they mill.

The laboratories in some of the larger Swedish mills are of the best to be found anywhere. Swedish mills were among the first to establish cereal testing laboratories for milling control and experimental purposes and nowhere does the cereal chemist play a more important role in mill operation than in Sweden. In several of the largest mills the chemist superintends the operation of the mill as well as that of his laboratory. In the laboratory control work at Swedish mills protein content of the wheat is given much more consideration than in the case of other European mills.

Like other European mills those in Sweden use a much greater linear amount of grinding surface than American mills. A miller in one of the large Swedish mills reported that in the milling of wheat he was using 65 millimeters of grinding surface per 100 kilograms of grain grinding capacity and in the milling of rye 45 millimeters. Based on flour extraction of 74 percent for wheat and 72 percent for rye these dimensions if converted into inches per bbl. of flour production capacity would be 3.08 and 2.19 inches respectively. American mills sometimes operate on as little as 1 inch of grinding surface per bbl. of flour. The use by European millers of so much grinding surface is attributed to the wider variation in kernel texture and other physical characteristics of the wheats which they grind and to the necessity for producing flour of longer extraction.

The wheats in the American millers' milling mixture are usually all of one class or of classes that are somewhat similar. The European millers' milling mixture usually consists of several types of wheat ranging from extreme softness to extreme hardness. Such mixtures require a more gradual and careful breaking and reduction of stock in order to obtain a clean and complete separation of flour from bran than do mixtures in which the wheats are of the same physical type and relative hardness. The necessity for the higher flour extraction arises from the fact that in European countries the

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difference in price between mill offals and flour is usually much greater than in America. This is due partly to the price regulation of bread grains and to the fact that in many instances mill offals must be disposed of in competition with feed grains and other feed materials which receive no price protection.

With respect to flour extraction percentage one of the largest mills operating in Sweden reported the following:

Wheat milling yields

Item	Percent
Patent flour	65.0
Clear flour	5.8
Low grade flour	3.3
Total flour	74.1
Middlings	4.8
Bran	21.6
Total of products	100.3
Milling gain	0.3

Rye milling yields

Item	Percent
Flour of first quality	52.2
Flour of second quality	19.9
Total flour	72.1
Offals	25.8
Total of products	97.9
Milling loss	2.1

Swedish mills are equipped with machines of German manufacture and use the German system of milling. One outstanding difference between this system and the American system is the greater number of sizing reductions used in the former. Most German and Swedish mills employ 5 to 7 sizing operations whereas American mills employ from 1 to 3. Compared with the system of milling used in English mills, Swedish mills use sifters more extensively for stock separations. In England some sifters are used on the coarse and granular stocks at the head-end of the milling process but on the softer stocks resulting from grindings at the intermediate and tail-end stages of the process the reel type of separator is used.

The cleaning equipment consists of a wide assortment of devices which collectively are capable of separating practically all the various sorts of foreign material found in wheat. As a general practice foreign and domestic wheats are washed and cleaned separately and in some instances are ground separately. The washing process, in addition to removing smut and other dirty matter from the surface of the kernel and the stones, grit or sand that may be present, also functions as the means by which the moisture content of the wheat is raised to the percentage desired for milling purposes.

To control the quantity of moisture present in the wheat at the time of grinding requires regulation of the washing and drying porcesses. Wheat of low moisture content or hard textures are given a longer immersion in the wash water and are subjected to less drying than are the softer or damper wheats.

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The grades of flour produced by the larger mills are similar to those produced by American mills. For mills operating on mixtures consisting of 12 percent of foreign wheat and 88 percent of domestic wheat the various grades of flour they produce are about as follows:

Flour Grade		Portion of extraction
Short patent	-	0 to 50 percent
Long patent	-	0 to 70 "
Straight	-	0 to 72.5 "
Clear	-	50 to 72.5 "
Low grade	-	70 to 72.5 "
Bakers	-	Clear combined with straight

According to information furnished to the writer by a prominent Swedish miller approximately 85 percent of the short patent flour sold is for household use, and 15 percent for commercial bakery use in the making of pastries. Sixty percent of the long patent flour sold is for household use and 40 percent for commercial baking. The Straight and "Bakers" grades are used only by bakers for bread purposes. Clear and low grade flour is mixed with rye flour for bread making. Clear flour is used with the lighter types of rye flour, and low grade only with the dark or interior types of rye flour.

Mills operating on 100 percent domestic wheat usually make only a straight grade flour. If a patent grade is made it is usually of long rather than short extraction. The various grades of flour milled by these mills are used for about the same purposes as those milled from wheat mixtures containing foreign flours but are sold to a less particular class of trade except that some is used in the production of a special type of "knackebrod".

As a general rule housewives want short patent flours, biscuit manufacturers want short and long patents and bread bakers want clears, straights, and "stuffed" straights.

Rye is milled to a higher percentage extraction in Sweden than in Germany despite the fact that the people of the former prefer rye bread of lighter color than do the German people. The desirable lightness of color is obtained by the admixture of wheat flour.

Wheat mixing practices

In former years, before the Swedish government saw fit to adopt measures for the protection of the agricultural industry of the country, the large mills used domestic wheats only sparingly, their mixtures containing chiefly foreign wheats. A considerable quantity of domestic wheat was exported and a considerable quantity was used for feeding purposes. Under present regulations, however, which limit the amount of foreign wheat and flour that may be used and which maintain a price level for domestic

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wheat considerably higher than the world prices, this order of things has been changed. Less domestic wheat is being used for feeding purposes, and very little is being exported. The trade requirements have always been for a good quality of flour, and to fulfill these requirements in past years the millers have considered it necessary to use a high proportion of the strong wheats in their milling mixture. Canadian, Russian, Argentine, and U.S. Hard Winters have been used in various proportions and combinations together with domestic wheat. Foreign wheats of the soft grade were little used. As long as there were no import and milling restrictions the price was an important factor in the choosing of the wheats to be used but with the restrictions that are now being imposed on the milling trade only the very strongest foreign wheats obtainable are purchased. Canadian Manitoba wheats of the No. 1 grade are considered to be the most suitable wheats and these are being purchased regardless of price almost exclusively. One miller stated that if there were no milling restrictions on the quantity of foreign wheat that could be used the most satisfactory mixture would be 60 percent domestic wheat, 30 percent Manitoba and 10 percent Hard Winter or Plate wheat.

In former years U.S. Hard Winter wheats were much used as well as a considerable quantity of U.S. hard wheat flours. Unlike most other countries the pastry trade of Sweden and the other Scandinavian countries demands a strong flour. U.S. Hard Winter wheats and Hard Winter flours were considered about ideal for this purpose. Some Argentine wheats are also suitable for this purpose. With limitations placed on the proportion of foreign wheat or flour that may be used it is doubtful if these would be satisfactory unless they were of the premium qualities.

It is admitted that the present quality of domestic milled flour is not as good as formerly. The 12 percent of foreign wheat which is the maximum proportion that millers are permitted to use, even though it is of the best quality obtainable, is not sufficient to enable them to produce a strong flour. The quality of the 1932 crop of domestic wheat was the best in recent years and if satisfactory results have been difficult of attainment during the crop just ended it will be even more difficult in years when the crop is of ordinary or average quality. Millersare of the opinion that under such circumstances the government will have to loosen up on its restrictions pertaining to the use of foreign wheat. The commission responsible for the milling regulations is intrusted with maintaining a standard of quality for flour which will be satisfactory for trade requirements and it is quite probable that some leniency will be shown in crop years when the quality of domestic wheats is not so good.

In order to know the effect of its regulations on the quality of the flour for domestic consumption this commission engaged the services of Dr. A. Akerman and the milling and baking laboratory at his Plant Breeding Institution (Sveriges Utsädesförening) at Svalöf. Men connected with this institution collect at regular intervals flour samples from the various mills and test their baking quality. Mills which are not producing flour of satisfactory quality sometimes are advised regarding methods of wheat and

flour treatment that may be of benefit in improving quality and are assisted in procuring domestic wheats more suitable for their purposes. Much experimentation has been done on the use of chemicals for improving the baking quality of flour and practically all mills use one or more methods of treatment.

In judging the milling properties of wheat protein content plays a much more importing role in this country than in other European countries. The routine testing for protein content is a common practice in the laboratories of the big er mills and is used as an index of value for domestic spring wheats. Besides having a relationship to natural baking quality the quantity of protein present is also believed to determine the extent to which the natural or inherent qualities of grain may be augmented by artificial means. High protein wheats respond to treatment much more readily than those of low protein content.

Baking

In the country districts most of the baking is done in the home but in the cities very little home baking is done except in families of the well- to-do class. People of this class do a considerable amount of baking but it is chiefly of fancy or special products other than bread. Considered from the standpoint of the country as a whole commercial baking in Sweden is carried on chiefly as a handicraft. In recent years, however, the industry has begun to develop more and more on a factory scale so that now in the larger cities the factory type of bakery does the major part of the business. The industry may be divided into two main types, one of the production of soft fresh breads, pastries, cakes etc. for local consumption and the other for the production of biscuits and hard breads of the Knackebrod and Spisbrod type for supplying a larger market.

The hour at which bakers may begin their day's work is regulated by law. Bakers in Sweden are permitted to have one man begin work at 4 A.M., but other employees may not begin work until 6 a.m. This is a serious handicap in the production of the fresh breads for breakfast demanded by the public. To overcome this handicap the baker uses a short fermentation method of baking. He does not use automatic mixers as in the case of the German baker but he sometimes prepares his doughs the preceding day and after fermentation has progressed to a certain stage placed the dough under refrigeration until the next morning or such time as it is needed. This practice is quite common in Sweden and is applied not only to bread products but to pastry products as well.

The kind of wheat bread required by the public is a soft texture loaf with a thin crisp crust. The most popular types of wheat bread are the so-called French breads. These are made in two shapes or sizes: the "large" French and the "small" French. The former is a slender loaf of about 14 inches in length and the other a round loaf somewhat larger than

the ordinary bun or roll type of bread. These breads have a soft and moist but coarse texture and thin crisp crust. They lack the hard crust and harsh crumb of real French bread.

Most of the bread is hearth baked. Although not much pan baking is done at the present time there is some tendency for this form of baking to increase. In the case of wheat flour breads the increase in pan baking is furthered by the trend toward weaker flours as the result of government restrictions on the use of foreign wheats, and also by the increased use of machine methods of baking. To obtain satisfactory results in hearth baking stronger flour is required than in pan baking and moreover the pan type of loaf is more adaptable to machine methods of baking than the hearth loaf. One baker stated that 10 percent of his bread was pan baked.

Most of the bread consumed contains some rye flour and is marketed under the name of rye bread although only a very small percentage of the output is made from pure rye flour. The rye breads used in the southern part of the country contain less wheat flour than those used in the northern part. It is customary for millers to mix their low grade, and in some instances their clear grade flours, with their rye flours. The bakers also mix wheat flour with the so-called rye flours which they use. The writer was told by one of the foremost milling chemists of the country that three years ago the average proportion in which wheat flour was mixed with rye flour by the millers was 40 to 45 percent and that the bakers added enough more of wheat flour so that the rye breads contained from 50 to 55 percent of wheat flour. Since that time the proportion of wheat flour added by the millers has increased to 55 percent to which the baker contributes enough more to bring the wheat flour content of the so-called rye flours up to 65 percent. From this practice it is apparent that the increase in consumption of wheat on the one hand and the decrease in consumption of rye on the other hand is not entirely due to a shift in consumers' demand from rye breads to wheat breads but is partly due to a shift toward lighter and whiter rye breads.

The trend in bread consumption is said to be downward, but it is not known whether this is due to any inferiority of quality as the result of government milling regulations or to the depression. It is the general belief, however, that if the present regulations remain in force during a year when the domestic wheats are of their normal low gluten quality the wheat bread will be of such inferior quality as to have a marked effect on wheat bread consumption. This will tend either to a decrease in consumption or a shift to rye breads. The popularity of wheat bread is chiefly based upon its appearance and texture of crumb. Flavor is of secondary importance. Appearance and texture of crumb is dependent on the quality and quantity of gluten; and when this fails people will turn to other foods. Rye flour on the other hand contains no gluten, therefore, rye breads are incapable of possessing the lightness of texture of wheat breads. Rye, however, possesses a flavor which is much more pronounced in character than that of wheat, and it is chiefly for its flavor characteristics that rye breads are eaten.

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This never fails; consequently there may be some inclination on the part of the people to substitute rye bread for wheat bread when the quality of the latter is poor.

One Swedish miller reported that the proportion of wheat flour production used for various purposes was about as follows:

Wheat breads, cakes, and pastries	66	percent
Mixed with rye flour for rye breads	25	"
Biscuits and wafers	1	"
Spisbrod and knackebrod	8	"
	100	"

Swedish pasteries called "wiener brod" are of a type peculiar only to the Scandinavian countries. They have a very flaky texture and are usually very tasty. The cakes, tea biscuits and wafers made in Sweden are similar to those made in England. No bakery products of the type known in America as oyster crackers, saltines and soda crackers were in evidence. Spisbrod and knackebrod, however, which are a kind of hard cracker are quite extensively used, especially the knackebrod sort. Also large quantities of knackebrod are exported. It is a flat crisp cracker made from rye or mixed wheat and rye flours containing some bran and germ stock. Several different grades of knackebrod are made. In America this product is generally known under the names of "Swedish rye bread" and "rye crisp". The Swedish production of spisbrod and knackebrod in 1931 is reported as amounting to nearly 200,000,000 pounds.

In the northern part of Sweden, particularly among the woodsmen, a peculiar form of pan cake is made which is used instead of bread. This pan cake is made from a batter consisting of water, salt and any kind or mixture of flour (wheat, rye or barley) that happens to be available. After the butter is prepared it is allowed to stand 30 to 50 minutes to permit swelling of the starch, and at about 5 minute intervals it is thoroughly stirred. This batter is then poured into greased pans and baked in the oven. It is estimated that from 5 to 10 percent of the total quantity of flour used in Sweden is consumed in this form of baking. These cakes are about an inch thick. Flour which will produce cakes with a smooth top surface of yellow color is considered also to have good bread baking qualities. If, however, the top surface of the cake has a slippery or watery appearance the flour is considered to be of poor bread baking quality. This relationship is considered so reliable that some millers determine the suitability of their flours for bread baking purpose by means of the pan cake baking test.

Dietary habits of the people

In the cities breakfast, consisting of coffee, bread, butter and eggs or porridge, is served about 8 a.m. The bread usually served is of the small "French" type and is fresh baked. Rolls of the ordinary type are little used. Dinner is served at 12 M. and is usually the substantial meal

of the day. It consists of hors d' oeuvres in great variety, meat or fish, vegetables, potatoes, bread, pastries (wiener brod) and coffee. At 4 p.m. some of the people drink a cup of tea with some sort of pastry. This, however, is not an established custom. At 6 p.m. supper is served. This consists of about the same foods as the noon meal. At 9 or 10 p.m. sandwiches and tea or coffee are served and sometimes cold meats. The hors d'oeuvres (Smörgas) served at noon and in the evening constitute a considerable portion of these meals and in some instances the major portion. They are served in very considerable number.

Among country people breakfast is served at about 6.00 a.m. during the summer months and 7.00 a.m. during the winter months. This meal consists of coffee, bread, butter and porridge or gruel. A second breakfast is eaten at 10.00 a.m. which consists of coffee and buttered bread. At 1.p.m. dinner is eaten consisting of bread, butter, meats or fish, vegetables, potatoes and berries or fruits in season. Sometimes a sour milk drink known as "Filbunke" is substituted for coffee. At 4 p.m. a lunch of coffee and bread is eaten. At 6.00 p.m. or after the day's work is finished, supper is eaten. This consists of pan cakes or bread with cold meat or salt herring.

The Swedish people are heavy eaters and like their meals to consist of a wide variety of foods. Their pastries, which are of the puff paste type, are of the finest to be found anywhere in the world. Their wheat flour breads are of good quality. Their so-called rye breads are usually of the light textured type consisting of a high proportion of wheat flour. The major proportion of the bread used is of this type. Some rye breads of the "schwartz" or black type are made, but these are in the nature of special breads. Szieback, knackebrod, spisbrod, and sweetened breads are very popular and are much used. Much coffee is consumed, particularly among the people of the northern part of the country. Hors d'oeuvres are of outstanding prominence in the dietary habits of the country. These can be purchased, ready for serving, in food shops and from street peddlers. They are of various kinds and assortments including salads, and pickled or preserved vegetables, eggs, fish and meats.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Norway

Production and requirements

Norway has a population of slightly less than 3 million people, so the quantity of bread grains necessary to meet her consumptive requirements is comparatively small. Domestic production of these grains, however, falls far short of her requirements, so that Norway is chiefly dependent upon the outside world for such supplies. During the past 5 years Norway's total production of wheat and rye has averaged about 1,200,000 bushels of which wheat has accounted for around 700,000 bushels and rye about 500,000 bushels. During the same period requirements based on disappearance figures have averaged about 15,000,000 bushels. Thus it is apparent that Norway's bread grain production constitutes only about 8 percent of her requirements.

From 1909 to 1933, the period for which statistics are here presented, the annual total production and disappearance of wheat and rye have shown very little tendency to change. If these grains are considered separately, however, it will be seen that since the 1909-13 pre-war period both wheat production and wheat disappearance have more than doubled, whereas in the case of rye, production and disappearance have decreased to nearly half the pre-war figure. These reverse tendencies therefore indicate a very pronounced shift from rye to wheat both in production and in consumption. See production and disappearance table, page 33.

The average annual importation of wheat and wheat flour during the period 1909-13 was 3,674,000 bushels and of rye and rye flour 10,644,000 bushels. In the crop year 1932-33 imports of the former amounted to 8,133,000 bushels or an increase of 4,459,000 bushels over the 1909-13 period. On the other hand imports of rye and rye flour in the crop year 1932-33 amounted to 5,042,000 bushels or a decrease of 5,551,000 bushels. In other words wheat (including flour) imports have increased 121 percent whereas rye (including flour) imports have decreased 52 percent.

Because consumption is largely of imported grains the chief influence responsible for the shift in imports from rye to wheat probably has been that of consumer preference for wheat breads or for rye breads containing a lower proportion of rye flour and a higher proportion of wheat flour. On the other hand the acreage shift to wheat appears to have been largely a response to wheat prices, that is, increased returns from wheat partly as a result of government aid and policy.

Domestic wheats

Most of the wheats produced in Norway are of spring habit. Wheats of winter habit are produced only in the southern part of the country and do not constitute more than 5 or 10 percent of the total wheat production.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES,CONT'D

The spring wheats are of fairly hard texture and of good appearance, but are said to be deficient in protein and of poorbaking quality. The principal varieties grown are Börsum, Fröya and Asshvete. The latter is a new variety. The winter wheats produced are poorer in quality than the spring wheats, and have a starchy soft appearance. They are of a small kernel type. In quality characteristics they probably more nearly resemble United States Western Red wheats than Red Winters. Thorso is the principal variety of winter wheat grown. The protein content of Norwegian wheats usually averages between 9 and 10 percent (basis 13.5 percent water).

Some work is being done on variety improvement but this appears to be chiefly under the direction of the State Grain Monopoly. The principal objective aimed at in this work is the development of varieties of better baking quality and shorter maturing habit. Some effort is also being made to increase the production of bread grains in Norway, but it is not likely that this will even approach a self-sufficiency basis for a long time to come if ever. The climate of Norway is not ideal for grain production; the winters are long and the harvests are usually wet. Because of dampness and lack of sunshine difficulty is often experienced in harvesting the grain. To insure against damage it is customary to place the cut grain on wires stretched between poles. In spite of these precautions the grain often contains an appreciable percentage of germinated kernels and a high moisture content. This latter is usually over 17 percent and is sometimes over 20 percent. Domestic production of wheat and rye in Norway, as previously indicated, constitutes only about 8 percent of the total quantity necessary for her consumption and other requirements. A portion of these requirements is for wheat for animal and poultry feeding purposes, and, due to the fact that domestic wheats are low in baking quality and milling value it is quite probable that in years past a goodly proportion of the home production of wheat was utilized for such purposes. In recent years, however, with the price of domestic wheat fixed by the government at a position considerably higher than that for foreign wheats it is probable that not much of the domestic crop has been used for feeding purposes. Imports of foreign wheats intended for feeding purposes are cosinized (colored) before they are offered to the public in order to prevent their use for purposes other than that of animal or poultry feeding.

Milling and flour trade regulations (State Grain Monopoly)

The import trade in wheat and other grains and their products has been under the complete control of a State Grain Monopoly "Statens Kornferretning" since 1928. The principle articles imported by "Statens Kornferretning" are wheat, rye, barley and wheat flour and occasionally smaller quantities of oats. The purchases are made on basis of offers which are submitted daily by agents of foreign grain exporters and mills, these agents keeping in touch with the Monopoly and thus being aware of the articles and positions which are of interest. The purchases are based on business principles partly regulated by the prices on the different markets and partly according to the requirements as to types and qualities. With

regard to the conditions of the different markets, "Statens Kornforretning" is kept well informed and tries, like a private firm, to take advantage of the market fluctuations.

The purchases of grain and flour are partly made f.o.b. and partly on c.i.f. terms. From North-America the grain is generally bought f.o.b. the different loading ports, while the grain contracted in other markets is bought c.i.f. one or more Norwegian ports. The wheat flour is generally bought c.i.f. Norway. With f.o.b. purchases, "Statens Kornforretning" provides the necessary tonnage and Norwegian steamship lines are to a large extent made use of in this trade.

Grain and flour bought on f.o.b. terms are insured under a floating policy with the leading Norwegian sea insurance companies. Payment is generally made cash on presentation of shipping documents for instance in New York, London, Rotterdam, etc. with the option of 90 days' sight draft, discount and stamp for buyers' account. The discharge of the grain and flour vessels are always inspected and quality, condition and quantity carefully surpervised.

According to contract between "Statens Kornforretning" and the Norwegian merchant mills, the mills are under obligation against a fixed rate to receive the grain imported, and to grind it according to instructions from "Statens Kornforretning". Further the mills are required to keep the flour and the mill-feed stored and have the products sold on their own responsibility. The mills must give monthly account on the sales. On basis of a similar contract the flour imported is taken over by the importers, who distribute the flour on their own risk against a certain compensation.

The selling price for each kind is the same all over the country, freight being paid by "Statens Kornforretning". Changes of prices are telegraphed to all mills and wholesale dealers and are put into force simultaneously all over the country. The selling prices are calculated on the basis of prices on the world market, but only on its broad features, as frequent changes have to be avoided if possible. The new prices apply to all stocks at mills and at wholesale merchant establishments and the losses if any on stocks are adjusted by the "Statens Kornforretning" according to agreement. By the establishment of the Monopoly, the import duty was abolished, except for oats and oats products. Besides its duty to provide the country with imported grain and flour the Monopoly also has to carry through different arrangements with the view of supporting domestic grain production. Accordingly the Monopoly is required to buy all grain suitable for human consumption, which is offered by the farmers.

Owing to the fact that the Norwegian farmers generally sell in small quantities, which may vary in quality and condition, and thereby give considerable trouble to the mills, the Monopoly has built grain elevators in several central districts where the different parcels are collected. In

order to obtain a uniform quality the grain is mixed, and if necessary dried and cleaned, and thereafter distributed to the various mills. Part of the grain which is collected in the above mentioned elevators, is sorted out and kept as a reserve for seed in case the requirements for seed grain should not be regularly covered.

The State Grain Monopoly maintains in Oslo a very elaborate cereal testing laboratory consisting of an experimental bakery and mill and various chemical apparatus for routine and experimental chemical analysis work. The experimental mill is complete in every detail and automatic in operation. It consists of two pairs of break rolls, 1 pair of sizing rolls and 1 pair of smooth rolls, a sifter, a purifier, an aspirator, a dust collector, a rolling screen separator, a milling separator and a scourer. The wheats ground on this mill are milled to a flour extraction of approximately 50 percent.

In this laboratory samples of the foreign flours and wheats purchased by the Monopoly are tested for quality. The tests on the flours are primarily for the purpose of ascertaining if the delivery is in accordance with the specifications under which the purchase was made. From the information obtained from the tests on the wheat samples the Monopoly determines what mixture of wheats is suitable for the trade's needs and makes its allotments to the various mills on this basis. In making these allotments some consideration is given to the millers' preference for various types, but to a very large extent the Monopoly decides as to the kinds of wheat the miller must use and the proportions in which they are to be ground. This laboratory also does grading analysis work on domestic wheats purchased by the Monopoly. The grading system used is similar to that used in Sweden.

The Monopoly purchases its supplies of foreign grain and flour direct from the exporter or his agent. In the case of flour imports, persons or companies who were formerly engaged in the flour importing business are permitted to act as distributors or wholesalers at a fixed margin of profit. Agents for foreign mills are not permitted to act as distributors.

No imported flour is permitted to be sold under the brand name of the foreign mill producing it, but must be sold under one of the brand names designated by the Monopoly. Seven brand types have been established for foreign flours and quality specifications have been formulated for each. The brands are as follows:

1. Patent Kanadisk Hvetemel (Canadian Patent) - ash content 0.48 percent; wet gluten 34 percent; water absorption 64 percent.
2. Almindelig, Kanadisk Hvetemel (Canadian 1st clear) - ash content 0.60 percent; wet gluten 35 percent; water absorption 65 percent.
3. Blandingsmel, Kandisk type No. 1 (Canadian 2nd clear) - ash content 0.80 percent, wet gluten 38 percent, water absorption 65 percent.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

4. Patent Hvetemel, Buffalo formaling (Buffalo patent); ash content 0.46 percent; wet gluten 33 percent; water absorption 63 percent.
5. Vinterhvete patent Amerikansk hvetemel (American Hard Winter Patent); ash content 0.45 to 0.50 percent; wet gluten 30 percent; water absorption 62 percent.
6. Patent Engelsk Hvetemel (English Patent).
7. Almindelig Engelsk hvetemel (English 1st clear).

Due to the fact that foreign flours are not permitted to be sold under the brand name of the foreign miller, the housewife and baker, when purchasing these flours, do not know whose product they are getting, and consequently give less consideration to these flours than formerly. On the other hand the domestic miller is permitted to market his flour under his own name and therefore is enabled to build up trade on the basis of reputation for quality. This gives the domestic miller a decided advantage over his foreign competitor who must market his flour through a middleman and under a brand name which others may use.

Because of this discrimination some people accuse the Monopoly of trying to build up the domestic milling industry by eliminating flour imports. This, however, is denied by officials of that organization. Even though the Monopoly may have no intention of eliminating imports of flour, it is nevertheless true that there has been a consistent downward tendency in flour importations during recent years. Flour import statistics of the 3 crop years beginning July 1, 1929 and ending June 30, 1932, show that during the first crop year of this period flour imports amounted to 66,702 tons, the second year to 65,514 tons and the third year to 59,030 tons. This latter represents a drop of more than 11 percent in tonnage of imports from the 1929-30 crop year.

Imports of flour from the United States have decreased more than from other countries. An agent of one large American mill claimed that his sales this year had decreased to 1/10 of what they formerly were. One reason for this decline was that United States flour prices have for some time been above those of other exporting countries. This factor, however, would not have had so serious an effect if these flours could have been sold under the brand name of the manufacturer, because with the high reputation for quality which some American flours have enjoyed in the past a higher proportion of the trade would have continued to have bought them somewhat regardless of the price differential between them and other flours. In Norway, English and Canadian flours do not have as good a reputation for quality as United States flours produced by the Buffalo mills. English flours in particular are considered to be inferior to Buffalo flours.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Milling practice and wheat preferences

According to a report issued by the State Grain Monopoly there were in Norway on June 3, 1932, 968 mills represented by 211 milling concerns. Most of these mills are of the grist grinding type and very small. Of the milling concerns operating on a commercial basis there are 16 which grind approximately 90 percent of all the flour milled in Norway. The principal commercial milling centers are Oslo and Bergen.

The commercial wheat mills operate almost entirely on foreign wheat, whereas the small grist mills usually grind only domestic grains; grists that the farmers bring to the miller for grinding. For grinding the farmer's grist of grain into flour the miller receives from the Monopoly 3 kroner and the farmer 1 kroner for each 100 kilograms of grain, and for grinding whole grain meal the miller receives 1 kroner (6.70 cents per bushel). The commercial mills receive their supplies of wheat from the State Grain Monopoly and must sell their products at the prices fixed by the Monopoly. The price at which the mills settle for their wheat supplies is determined by deducting from the fixed prices at which the mill products are sold a certain fixed grinding fee based on a 73 percent flour extraction. It is reported that Norway has sufficient milling capacity to mill all the flour needed for domestic consumption.

Commercial mill sales of flour and other mill products of Norwegian manufacture for the two fiscal years 1930-31 and 1931-32

Description	1930-31	1931-32
	1,000 pounds	1,000 pounds
Wheat flours, sifted - 73 percent extraction	150,824	157,192
" " unbolted	19,794	34,575
Rye flour, sifted - 60 percent extraction	5,438	5,719
" " " - 65 percent extraction	25,234	3,349
" " " - 67 percent extraction	1,170	---
" " unbolted	23,509	30,883
Blended sifted flour - 67 percent extraction rye (15 percent wheat, 85 percent rye flour)	210,555	209,596
Blended coarse flour unbolted (10 percent wheat, 90 percent rye	3,194	7,640
Grits - 58 percent extraction	10,973	10,690
Grits - 70 percent extraction	8,152	6,201
Barley flour - 80 percent extraction for human consumption	1,582	1,761
Barley flour, unbolted	4,451	3,745
Groats	235	272
Semolina	67	146
Total	468,178	471,769

Statens Kornforrentnings, Beretning III, Fiscal Year 1931-32.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

At the prices at which the various foreign wheats were being offered in June 1933, officials of the Monopoly stated that the most suitable milling mixture for the Norwegian trade was a mixture of Manitoba and Plate wheats in which the former represented from 40 to 50 percent of the mixture. The Manitobas used are chiefly of No. 2 grade. Some No. 3 and 4 grades of Manitoba wheats are also used. The type of Plate wheats most used is Barusso for the reason that the Scandinavian countries have better shipping connections with Buenos Aires, the port of shipment for this type of wheat, than with the other ports of Argentina. United States Hard Winters and Russian wheat are also suitable for milling mixtures when they can be purchased at a proper price. If United States Hard Winter wheats were the cheapest wheat available it could be utilized to the extent of 75 percent of the total foreign wheat import requirements of Norway.

Hard Winter wheat is considered to be superior in quality to most Plate wheats and more uniform in quality. Russian and Plate wheats are considered to be very variable in quality. It was stated that certificate final terms were a satisfactory basis for purchasing American wheats.

The quantity of foreign wheat purchased by the State Grain Monopoly during the 1929-30 crop year amounted to 123,076 short tons; during the 1930-31 crop year to 154,476 tons and during the 1931-32 crop year to 169,468 tons. The types of wheat purchased during the 1931-32 crop year were as follows:

Wheat type	Short tons	Percent
Manitoba	67,300	39.71
Plate	31,361	18.51
Russian	47,399	27.97
Danubian	14,039	8.28
Hard Winter	551	0.33
Australian	8,818	5.20
Total	169,468	100.00

Statens Kornforretnings, Beretning III, Fiscal Year 1931-32.

The information in the foregoing table indicates, to some extent, the kinds of wheat suitable for the Norwegian trade, but the data presented must not be interpreted as representing the proportions in which these different wheats appear in the milling mixtures used. The proportionate amount of each purchased was influenced to a considerable degree by its price relationship to other wheats. This relationship changes from time to time, consequently the proportions in which the various types of wheat are purchased also change and milling mixtures must be varied accordingly. Moreover, some of the wheat purchased was for feeding purposes, therefore it is possible that some of the types here mentioned may not have been used in milling blends for the production of flour.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Baking practices and baking products.

The Norwegian baking trade demands a very strong wheat flour of high diastatic activity. The wet gluten content of these flours must be between 30 and 35 percent. The wheat breads produced are high in texture and of excellent quality. The pastries and cakes are similar to those produced by Swedish bakers. These too are excellent in quality. A fairly strong flour is required for them. United States Hard Winter wheat flours have the quality characteristics suitable for these latter products.

Bakers are not permitted to begin work before 6 o'clock in the morning; therefore in order to produce fresh breads in time for breakfast many bakers use automatic mixers like those found in German shops. Two and one-half hours is about the length of time at which the wheat flour bread doughs are fermented. The Swedish practice of preparing the doughs the afternoon preceding the day of baking and retarding fermentation during the night by chilling is not used in Norway.

The term "bread" in Norway means a bread product consisting of 20 to 45 percent of wheat flour and the remainder of rye flour. This is the type of bread most generally used. On June 9, 1933, the retail price in Oslo of this type of bread was 36 ore for a one-kilogram loaf (4.20 cents per pound). The retail price of wheat bread was 38 ore per $\frac{1}{2}$ kilogram loaf (8.86 cents per pound) and 74 ore per one kilogram loaf (8.63 cents per pound). The sweet breads which are so popular in Sweden are not much used in Norway. Knackebrod ("Rye crisp") a sort of hard cracker made from rye meal is very popular as is also flat bread. The latter is a bread made in large thin sheets of wafer like appearance. It has excellent keeping qualities.

Dietary habits

In the cities breakfast is a light meal consisting of bread, coffee or milk and, in about 50 percent of the cases, eggs. This meal is served at 7 to 8 a.m. The next meal is between 12 M. and 1 p.m. For office workers this is usually a light meal consisting of bread, butter, eggs and coffee, milk, tea or chocolate. The use of chocolate is increasing. Factory people eat a heavier meal at this time of day consisting of soup, meat or fish, potatoes, vegetables and some bread. Their drink is water or beer. Many of the factories have kitchens and dining rooms for serving dinner to their employees.

The heaviest meal of the day for office is at 4:30 to 5:00 p.m. This usually consists of soup, bread, meat and/or fish, potatoes, vegetables, coffee and some sort of desert. This is the last meal of the day. The evening meal for factory people and other workers who eat a heavy meal at noon time usually consists of bread, butter, jam, cheese and cold meats.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

The eating habits of country people are somewhat different from those of city people. In summer time breakfast is eaten at 5:00 a.m. and consists of bread, butter, soup or porridge and coffee. Between 9 and 10 a.m. a light lunch consisting of bread, butter, and coffee is served. At 1:00 p.m. the heaviest meal of the day is eaten. This usually consists of soup or porridge, meat or salted fish (fresh fish are not easy to obtain in the country) potatoes, vegetables, coffee and occasionally some desert such as berries or fruit in season. The next eating time is at 5:00 or 6:00 p.m. This consists chiefly of bread and coffee. In the winter time among country folk breakfast is at 7:00 a.m. lunch at 10:00 a.m., dinner at 1:00 p.m. and supper at 4 to 5 p.m. Country people use much syrup. They use this on their bread either with or without butter. These people also use considerable quantities of salted herring. Soups from rice and porridges are popular.

Bread is a main article of diet among Norwegians. The chief kind of bread used is the mixed rye and wheat flour bread previously described. One kind of bread that is popular and which is apparently a speciality of the country is the so-called "flat bread". Pastries of the so-called Swedish or Danish type are popular. In many respects the eating and living habits of the Norwegian people are more nearly like those of the American people than are those of any other European people. This is particularly noticeable in the restaurants at noon time. The lunches served in these restaurants are very similar to those served at that time of day in American restaurants. Lunches consisting of a salad or sandwich with a piece of pastry of some sort and a glass of milk or cup of coffee or even a glass of water is quite customary. Water drinking is not so uncommon in Norway as in most other European countries. A sort of curdled milk preparation is one of the special dishes of Norway.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Denmark

Production and requirements

Denmark produces at the present time less than half of her total requirements for wheat and rye. The total production of these two grains in 1932, in that country was 19,316,000 bushels, whereas the requirements as measured by disappearance (production plus net imports) were 41,879,000 bushels. The population of the country is approximately 4,000,000 persons.

A study of the production data (see table page 33), shows that since the 1909-13 pre-war period wheat production has nearly doubled while that of rye has decreased to less than half. That the increase in wheat production did not offset the decrease in rye production is evidenced by the fact that there has been a decline of nearly 6,000,000 bushels in total annual production of these two grains since the pre-war period. It is of interest to note in connection with these changes in production that before the war, rye production was more than three times as great as wheat, whereas at the present time it is considerably less than that of wheat production. The predominance of rye over wheat was lost with the crop of 1928 and in no year since then has rye production or disappearance exceeded that of wheat.

In both wheat and rye, exportations have been made each year, but in no instance have exports exceeded or even approached the volume of imports. In the case of wheat (including flour) imports have ranged from 6,886,000 bushels to 17,392,000 bushels, showing an upward tendency since the war. Rye imports have ranged from 6,550,000 to 13,468,000 bushels. For the crop years from 1925 to 1928 inclusive they have been under the pre-war average, but since that time, except for the year 1931, they have been considerably above the pre-war average. See table, page 34.

Characteristics and quality of Danish wheats

Danish wheats are mostly of very soft texture. Some wheats of the hard type are grown but these lack the qualities generally associated with such wheats as grown in other countries. Practically all of the wheats produced are of winter habit and most are of red color. Largely because of the fact that the farmers of Denmark do not employ a uniform system of crop rotation there is a rather wide variation in protein content, the range in this factor being from 6.5 percent to 13 percent (basis 13.5 percent moisture). These wheats are generally of high moisture content and of poor baking quality. This latter applies even to the wheat of higher protein content.

Because of their poor baking quality these wheats are used chiefly for livestock feed. Denmark can use for feeding purposes all the wheat she produces; in fact, when there is a good market for pork the crop is insufficient for its feeding requirements. Only a small portion of the

crop is used for milling purposes. According to a printed article by Dr. Holger Jorgensen dated September 1932, 11 percent of the 1930 crop and 4 percent of the 1931 crop were used for milling purposes.

Considerable experimental work has been done to determine the effect on the baking quality of wheat of various kinds of fertilizers applied at different stages in the growth of the plant. This was done in anticipation that possibly it might be necessary at some future time to require millers to use more of the domestic wheats. Experiments have been conducted also to determine if the quality deficiencies of Danish wheat can be corrected by the addition of some chemical to the flour or by the application of some treatment thereto. These latter experiments have indicated that certain quality deficiencies can be corrected if the wheats are of high protein content, but not if they are of low protein content. On the other hand, the fertilizer experiments have demonstrated that the protein content of domestic wheats can be raised to a relatively high point. Consequently in case economic conditions make it necessary for the government to adopt regulations requiring the mills to mill a higher proportion of domestic wheat, it is very probable that some action will also be taken requiring farmers to fertilize their wheat land in such manner as to insure the production of high protein content wheat.

Wheat and flour trade regulations

The majority of the Danish people are against the principle of taxing foodstuffs but it is realized that wheat farmers at the present time are in need of some form of relief. The question of how to give relief to wheat farmers is, however, complicated by the fact that the pig industry would be injured if this relief meant an increase in the price of domestic wheat.

There are approximately 4,000 farms in Denmark of 200 to 300 acres in size which might be classed as large farms, 80,000 medium sized farms and 120,000 small farms. Wheat and rye is produced chiefly on the large farms, whereas pig raising is done chiefly on the small farms. The pig producers want cheap feeds and have in years past used a considerable proportion of the domestic crop of wheat for feeding purposes. Consequently they are opposed to any form of relief that will increase the price of domestic wheat, and because of the fact that the number of farmers engaged in raising pigs greatly exceeds the number of those engaged in wheat production, their opposition is an important factor in the solution of the problem. Pig producers are quite willing to use domestic wheats but only at prices that will insure them a profit. It will be seen therefore that in the event the government took action fixing the price of domestic wheat above world prices pig raisers would substitute other feeds. That would mean that the wheat producer would have to look elsewhere for a market for his crop. The only marketing outlets left for him would be the domestic milling industry and the export trade; but neither of these offer very favorable possibilities.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Owing to the poor baking quality of domestic wheat Danish millers do not want it. Moreover, if they did use it to the extent of 100 percent of their milling requirements, the amount of flour obtained would considerably exceed that normally milled in Denmark from all wheat. Furthermore, if the millers were required to use a considerable percentage of domestic wheat in their milling mixture the quality of the resulting flour would be so low that consumption would be greatly reduced. Such an effect would please neither the miller nor the producer and certainly would be very unsatisfactory to the consumer.

Wheat production and wheat utilization for flour in Denmark

Item	1930	1931
	Bushels	Bushels
Imported flour (converted to wheat).....	3,486,942	3,332,620
Foreign wheat milled in Denmark	4,420,223	5,180,810
Danish wheat milled in Denmark	1,087,603	404,177
Total utilization of wheat for flour.....	8,994,768	8,917,607
Production of wheat	10,214,647	10,052,976
Excess of production over utilization flour	1,183,135	1,135,369

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In regard to the exporting of domestic wheat as a possible means of giving relief to the producer, this is impracticable. First it would involve the payment of an export bounty or subsidy of some kind and secondly, it would mean that other grains would have to be imported for the use of pig feeders. It would be far simpler to pay the bounty direct to the farmer and let him sell his wheat to the pig producer at its market value for feeding purposes.

Thus far no drastic action has been taken by the government to bring relief to the wheat grower. The only relief given has been of an indirect nature which has resulted in some increased utilization of wheat for milling purposes. This has consisted of restrictions imposed on wheat and flour imports through foreign exchange regulations. According to the scheme operating in June 1933, before wheat or flour could be imported, a licence had to be obtained from the government. This licence represented an apportionment or allotment of foreign exchange, that could be used for specific import purposes. Through the workings of this scheme it has been possible not only to restrict importations but also to favor the import of wheat over that of flour and to give preference to certain countries. Some complaint was made to the writer that this latter was being done. About September 1, 1933, the Foreign Exchange Committee of the Danish Parliament issued a statement that this plan would be continued until October 1, 1933, when it is expected that the Parliament will adopt a new plan agreed on by the Agricultural Committee of Parliament.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

This plan (not yet adopted December 1, 1933) calls for a tax to be levied on imports of wheat and flour which will be fixed according to the respective prices. This tax in the case of wheat will be based on a c.i.f. price at Danish ports of 14 kronor per 100 kilograms (87.09 cents per bushel). The funds collected in this way will be administered by a grain committee which will fix the respective amount each month. Thus a fund will be created which will be distributed among farmers and bakers according to certain regulations. The purpose for distributing some of this money to the baker is to compensate him for the advance in flour cost so that there will be no increase in the price of bread. The plan provides that the money required to keep bread prices from rising will be paid out first and then half of the remainder of the fund will be distributed among agricultural enterprises with a land value of less than a certain determinable amount per area unit and the other half among all agricultural enterprises according to tax value.

Milling practices

All of the important commercial mills of Denmark are located in sea port cities. There is no concentration of the milling industry at any one port, in fact at none of the ports is the milling capacity sufficient for accommodating full cargo transactions in wheat. Cargo shipments are usually divided with other ports. Most transactions are in parcel lots. The largest milling concern in Denmark operates 4 mills. These mills are equipped with United States milling machinery and use the American system of milling. They are believed to be the only mills in Europe operating on the American system and with American milling equipment.

Two general types of wheat flour are made by Danish mills, one is primarily for bread and the other for pastry and household use. The bread flours are made from a fairly strong mixture of wheats and the pastry and household flours from a mixture of soft and semi-hard wheats. According to one person interviewed, a suitable mixture for the bread flour would consist of 20 percent Danish, 20 percent Argentine Plate and 60 percent Canadian Manitoba of Nos. 1, 2 and 3 grade, whereas a suitable mixture for the pastry flour would consist of soft wheats and some Plate wheats. One miller stated he had used no Danish wheats in his mill in the last two years. At the time he was interviewed he was making his bread flour from a wheat mixture consisting of 60 percent Manitoba, and 40 percent Plate. He usually liked his mixture to consist of 3 wheats but at that time (June 1933) no other wheat of suitable quality was available at a price at which it could be used.

United States Hard Winter wheats are suitable in milling mixtures for bread flours and can be used at prices 3 to 4 percent above prices for Plate wheats. Montana and Duluth spring wheats are held in high regard by the Danish millers but no offers of these have been made in recent years. United States Red Durum wheat is reported as being of too hard texture for chicken feed. Canadian wheat from the Atlantic coast ports is

considered superior in quality to that shipped from Vancouver, but because of more favorable shipping connections with Vancouver and lower freight charges it is said that most of the Canadian wheat used in Denmark comes from this latter port.

Forms of flour consumption

Information furnished to the writer by the Teknologisk Institut of Copenhagen indicates that Denmark consumes annually about 1,945,897 barrels (196 pounds) of wheat flour and grits and 1,754,682 barrels of rye flour. The fact that the former is used for a number of purposes other than bread baking whereas rye flour is used exclusively for bread baking leads to the conclusion that the consumption of rye bread greatly exceeds that of wheat bread. This conclusion is further strengthened by the fact that much of the rye bread contains some low grade or clear wheat flour. According to certain information by the above mentioned institute it would appear that the consumption of rye bread is more than three times that of wheat bread and is increasing.

Rye bread is the bread of the masses and is much cheaper than wheat bread. In June 1933, the retail price of rye bread was 20 ore per kilogram (2.07 cents per pound) while that of wheat bread was 66 ore (6.84 cents per pound). To most people wheat bread is a delicacy which can be afforded only on special occasions. It is usually made in small loaves of .30 and .60 kilogram (.66 and 1.32 pounds respectively) size and of the French type shape. Most of it is hearth baked. It is of light texture and has a thin crispy crust and its quality is very good. Other forms or types of bread made include rolls, zwieback, rusk and table breads. As a general rule in the making of these various types of bread, milk is used instead of water.

One of the important uses of wheat flour is in the baking of pastries which are a speciality of Denmark. The ingredients used in making these pastries are flour, milk, egg whites, sugar, yeast and cardamon. The rye breads used in Denmark are usually dark in color, close textured, compact, heavy and moist. They are slightly sour in taste and have a slightly aromatic smell. As in the case of pastries these rye breads are considered a speciality of Denmark. The Danish bakers believe they have developed a technique in making rye bread that is superior to that used in other countries.

Baking practices

The baking of rye bread in the cities is usually done in large bakeries especially established for that purpose. The product of these bakeries is distributed among small bakeries the owners of which are share holders of the larger bakery. In the villages and small towns, however, out of reach of these special rye bread bakeries rye bread is baked in the same shop with wheat breads and pastries. Except as noted above, the product of the bakery is sold direct to the consumer either at the bakery shop or by some scheme of delivery service.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Bakery shops are quite numerous. Some of these are independently owned and operated and some are of the chain type owned and operated as a distributing depot for a larger bakery. In 1929 there were about 3,500 baking concerns in Denmark. Most of the business done by the shops is over the counter and involves no delivery expense.

Wrapped breads are not popular in Denmark. Consumers require fresh bread and want to convince themselves of this by looking at the loaves. From the standpoint of sanitation, wrapping is not considered necessary as strict sanitary regulations are enforced in regard to sales rooms and the handling of bakery products. One regulation requires that bread delivered to a consumer from a wagon must be carried in a white cloth. On June 1, 1921 a law became effective which prohibited the use of night labor in bakeries. Since then mechanical means for baking have to an increasing degree come into use in Danish bakeries. This is especially true in regard to the large rye bread bakeries. The smaller shops usually have only a kneading machine and a dough divider.

According to the Copenhagen Teknologisk Institute the approximate normal composition of rye flour and wheat flour suitable for Danish breads of the most usual types is as follows:

	Rye flour for coarse rye breads	Wheat flour for wheat bread
	Percent	Percent
Dry matter	86.15	87.20
Nitrogen	1.52	2.2
Protein (N.X.5.7)	8.66	12.65
Ash	1.49	0.50
Raw fat extracted by ether	1.78	1.14
Fiber	1.90	0.12
Pentosans	7.75	2.59
Starch	64.52	70.2

Since the prohibition of night employment in bakeries Danish bakers, in order to meet the demand of consumers for fresh bread in the early part of the day have adopted the following two procedures in baking. The one method aims at as short a fermentation as possible and the other at a prolongation of fermentation beyond the normal time in order that the fermentation process may be allowed to take place during the hours from 8 p.m. to 4.a.m. during which time the law prohibits the employment of labor. The formula and baking procedure followed in the various baking methods used are as follows: (Formulas calculated on 100 kilograms of flour (220.46 pounds).

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

Short proofing method

100	kilograms	wheat flour of high protein content
65	"	skimmed milk
1/2	"	salt
1	"	pure lard
1	"	low diastatic extract of malt (150 degrees Lintner)
4	"	compressed yeast

Temperature of the dough, 32° C
Consistency of the dough, firm.

The kneading lasts about 20 minutes in order to insure that the yeast is well mixed into the dough. Then the dough is allowed to ferment about 20 minutes after which it is punched and shaped or moulded into oblong pieces and put in a damp proofing cup-board for proofing. When proofing has proceeded to the desired point the doughs are placed in an oven which during the first 10 minutes of the baking process is under heavy steam. The temperature of the oven is about 220°C. The weight of the loaves is 0.30 and 0.60 kilograms (.66 and 1.32 pounds).

Normal fermentation method

100	kilograms	wheat flour of normal composition
60	"	skimmed milk
1	"	salt
1	"	pure lard
1/2	"	low diastatic extract of malt (150 degrees Lintner)

Temperature of the dough, 28° C.
Consistency of the dough, normal.

After kneading it is allowed to ferment an hour, punched, fermented another hour, punched, fermented a half hour, punched, moulded, then proofed and baked. The proofing and baking is as described in the procedure for the short fermentation method.

Prolonged fermentation method.

100	kilograms	wheat flour, principally of soft wheat
55	"	skimmed milk
1/2	"	salt
1/2	"	low diastatic extract of malt (40 degrees Lintner)

Temperature of the dough, 23° C
Consistency of the dough, very firm.

The dough is placed for fermenting, in a room where the temperature is about 25° C. It is coated with pure lard, in order to prevent crust formation, and is not punched or touched until after 8 hours. At the expiration of this time it is given a slight punching and is then moulded, proofed and baked as described in the preceding methods. The temperature for baking by this method is about 200° C.

In making the small or piece types of bread such as rolls and the so-called table breads the following formulas and procedures are used:

Rolls:

1 1/2 kilograms wheat flour of high protein content; 1 liter milk 35°C; 100 grams compressed yeast; 50 grams margarine or pure lard; 20 grams extract of malt. Temperature of the dough, 28° C. Consistency of the dough, soft.

After 1 1/2 hours fermenting with 2 punchings the doughs are moulded then placed in a proofing cupboard under steam for about 20 minutes. After proofing they are placed on plates, sprinkled with water and inserted in the oven. The baking takes place in an oven under steam for about 20 minutes with oven temperature about 220° C.

Table bread types:

1 1/2 kilograms wheat flour, principally of hard wheat, is mixed with 1 liter milk, 50 grams compressed yeast, and 20 grams salt.

After kneading the ingredients into a dough of normal consistency at a temperature of 25° C the dough is allowed to ferment one hour, then given a strong punching, allowed to ferment 1/2 hour, again punched, and then another 1/2 hour's fermenting, after which it is ready for further treatment. To each kilogram of this prepared dough is added 100 grams of butter, as a rule the same quantity of margarine, 50 grams sugar, 1 egg, 50 grams compressed yeast and a little cardamon and as much wheat flour as is necessary for producing a dough which may be termed firm. After this preparation the dough is kept for about 1 hour, punched, then shaped and baked.

Dietary practices

The writer made no special inquiries regarding the dietary habits of the Danish people, but it is a well known fact they they are hearty eaters. Bread and potatoes are the main articles of diet. Hors d'oeuvres are very popular and are much used. Like most European people Danes are a leisurely people and in years past have been accustomed to linger over their meals. Recently in Copenhagen, however, a number of restaurants of the automat type have been established and are proving very popular with the poor and middle classes of people. In these restaurants people spend less time at their meals and usually eat and drink less. It is quite possible that the success of these restaurants may ultimately influence other restaurants to develop along the lines of short order service. The tendency in that direction, as is evidenced by the popularity of the automats, indicates that some change might be taking place in eating habits of the Danish people.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

BREAD GRAINS: Acreage and production in the Scandinavian countries, 1909-1913 and 1925-1933

Country and crop year	Acreage			Production		
	Wheat	Rye	Total	Wheat	Rye	Total
	1,000 acres	1,000 acres	1,000 acres	1,000 bushels	1,000 bushels	1,000 bushels
SWEDEN -						
Average 1909-1913.	255	977	1,232	8,103	24,100	32,203
1925.....	363	871	1,234	13,359	26,615	39,974
1926.....	381	838	1,219	11,298	23,094	34,392
1927.....	561	682	1,243	15,835	15,144	30,979
1928.....	562	682	1,244	19,155	16,954	36,109
1929.....	574	633	1,207	19,011	16,209	35,220
1930.....	646	596	1,242	20,819	17,182	38,001
1931.....	683	512	1,195	17,033	11,146	28,179
1932.....	746	516	1,262	26,500	17,094	53,594
1933.....	799	545	1,344	29,204	18,128	47,332
NORWAY-						
Average 1909-1913.	12	37	49	306	973	1,279
1925.....	22	22	44	490	614	1,104
1926.....	22	23	45	586	647	1,233
1927.....	25	23	48	605	606	1,211
1928.....	28	18	46	798	497	1,295
1929.....	30	18	48	750	538	1,288
1930.....	30	19	49	720	556	1,276
1931.....	29	15	44	592	378	970
1932.....	28	16	44	749	522	1,271
1933.....	28	16	44	770	438	1,208
DENMARK -						
Average 1909-1913.	154	636	790	6,322	19,104	25,426
1925.....	199	530	729	9,748	13,745	23,493
1926.....	252	514	766	8,767	12,480	21,247
1927.....	274	453	727	9,408	10,364	19,772
1928.....	252	361	613	12,214	9,683	21,897
1929.....	260	380	640	11,772	10,411	22,183
1930.....	249	369	618	10,216	10,025	20,241
1931.....	259	332	591	10,053	8,406	18,459
1932.....	245	297	542	10,997	8,736	19,733
1933.....	260	352	612	11,390	10,236	21,626

Official sources.

BREAD GRAIN CONSUMPTION AND TRADE IN SCANDINAVIAN COUNTRIES, CONT'D

BREAD GRAINS: Disappearance and net imports in the Scandinavian countries, 1909-1913 and 1925-1932

Country and Crop years	Disappearance			Net imports		
	Wheat	Rye	Total	Wheat	Rye	Total
	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels
SWEDEN -						
Average 1909-1913	15,160	27,981	43,141	7,057	3,881	10,938
1925.....	19,397	27,972	47,369	6,038	1,357	7,395
1926.....	17,206	22,082	39,288	5,908	1,012	4,896
1927.....	24,566	18,685	43,251	8,731	3,541	12,272
1928.....	26,632	21,244	47,876	7,477	4,290	11,767
1929.....	26,173	20,385	46,558	7,162	4,176	11,338
1930.....	26,226	18,293	44,519	5,407	1,111	6,518
1931.....	24,640	13,903	38,543	6,592	2,159	8,751
1932.a/...						
NORWAY -						
Average 1909-1913	3,980	11,566	15,546	3,674	10,593	14,267
1925.....	6,831	8,333	15,164	6,341	7,719	14,060
1926.....	6,526	7,685	14,211	5,940	7,038	12,978
1927.....	7,467	7,913	15,380	6,862	7,307	14,169
1928.....	9.336	6,521	15,857	8,538	6,024	14,562
1929.....	7,880	7,585	15,465	7,130	7,047	14,177
1930.....	8,995	5,772	14,767	8,275	5,216	13,491
1931.....	9,385	6,671	16,056	8,793	6,293	15,086
1932.....	8,918	5,567	13,485	8,133	5,042	13,175
DENMARK -						
Average 1909-1913	12,880	27,569	40,449	6,558	8,465	15,023
1925.....	15,737	21,930	37,667	5,989	8,185	14,174
1926.....	15,377	18,585	33,962	6,610	6,105	12,715
1927.....	19,889	17,348	37,237	10,481	6,984	17,465
1928.....	29,253	16,507	45,760	17,039	6,824	23,863
1929.....	19,542	20,783	40,325	7,770	10,372	18,142
1930.....	21,626	23,070	44,696	11,410	13,045	24,445
1931.....	27,397	16,317	43,714	17,344	7,911	25,255
1932.....	22,786	19,093	41,879	12,131	10,432	22,563

Official sources.

a/ Import and export figures not available.